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11.

Herring Work in 1934—35.

Spent Herring in the Coastal Zone of the Intermediate Channel—North Sea Region.

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As emphasized on previous occasions, the shoal of herrings that regularly visits the French and Belgian coasts between Cape Gris-Nez and the Scheldt is a clearly distinct concentration of spent fishes and, as such, appears to be a favourable object for the study of the life cycle of the species in the Southern North Sea. It was, therefore, considered expedient to submit the shoal to continuous observations during successive years. The times of its appearance and disappearance and its occurrence along the coast were noted during the entire season. Daily samples of 30 herrings were analysed in order to follow the variation in abundance, year-class composition, stades of gonads, weight, length, quantity of fat, number of vertebrae, etc., as well as the weight and value of the total capture and the total calculated number of individuals destroyed. The results obtained during the period of the last five years, as far as the percentage of individuals is concerned, are set out in the diagram, which we call the "Biological Scale" of the shoal — Fig. 1. Further data are found in the short texts in the margin of each of the steps of the scale. More details will be given in the memoir now in preparation. For the present we shall not go beyond a few preliminary remarks.

Remarks.

I) The composition of the annual steps of the Scale shows that each individual year-class is increasing in number up to the fourth year of age and then decreasing more or less rapidly down to the tenth year. (The very few that are still surviving after ten years are not marked in the diagram).

II) A class appearing in the shoal with a high initial percentage at the age of 3 years is likely to increase notably afterwards and to keep a still higher proportion in the two following years. (See classes 1927 and 1929).

III) Conversely, a class appearing in the shoal with a low percentage in its third year generally attains only a small proportion in the fourth and rapidly decreases in the following years, see classes 1928 and 1930.

IV) A special interest is attached to the year-class 1929 attaining, in 1933—34, the highest percentage in our records: 52%. The initial percentage of this class was 24% in 1932—33, which is also the highest one recorded at the first appearance in the shoal, except that of the year-class 1931 which attained 25% in the latest season, 1934—35.

V) The entry into the shoal of the rich 1929 class had a lowering effect on all other classes in 1933—34, (balancing of percentages).

Fig. 2 shows what all the class-columns in 1934—35 would have been if the youngest class 1931 had been a poor one with a proportion supposed to have been only 5% instead of 25%: the class 1929 instead of sinking from 52% down to 40%, would still have been at more than 50%.

VI) The mean weight of one day's capture being the only means of appreciating the abundance of a shoal of coastal spents it appears that the shoal of 1934—35 was the densest on record, as shown in the table below:

1927—28	mean weight of one day's capture	4,739 kg.
1928—29	—	11,545 -
1929—30	—	7,802 -
1930—31	—	8,338 -
1931—32	—	5,225 -
1932—33	—	4,514 -
1933—34	—	7,600 -
1934—35	—	14,632 -

Commercially, however, it was one of the worst seasons remembered, the average price per kg. being as low as 31.52 fr. — which is also a record.

Biological Scale of Spent-Herring.

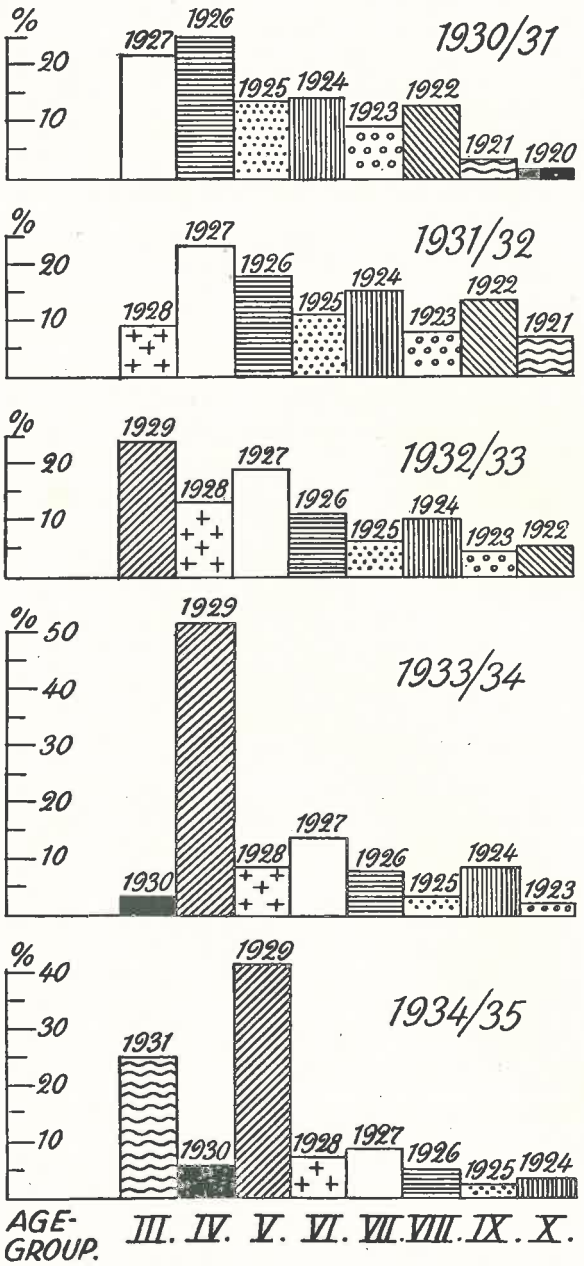

Fig. 1. Percentage number of individuals in each year-class.

1930—31

Number of herrings examined.....	1,167
Mean weight of a day's capture	8,338 kg.
Total weight landed in the season ...	18,360,596 kg.
Mean value of 100 kg.....	71 fr.
Total value of the season	13,008,930 fr.
Number of individuals destroyed.....	217,002,545

1931—32

Number of herrings examined.....	783
Mean weight of a day's capture	5,225 kg.
Total weight landed in the season ...	3,383,750 kg.
Mean value of 100 kg.....	108 fr.
Total value of the season	3,642,806 fr.
Number of individuals destroyed.....	34,992,241

1932—33

Number of herrings examined.....	1,000
Mean weight of a day's capture	4,514 kg.
Total weight landed in the season ...	2,673,185 kg.
Mean value of 100 kg.....	91.50 fr.
Total value of the season	2,446,867 fr.
Number of individuals destroyed.....	29,405,035

1933—34

Number of herrings examined	1,479
Mean weight of a day's capture	7,600 kg.
Total weight landed in the season ...	7,455,800 kg.
Mean value of 100 kg.....	75 fr.
Total value of the season	5,577,441 fr.
Number of individuals destroyed.....	76,861,050

1934—35

Number of herrings examined.....	1,200
Mean weight of a day's capture	14,632 kg.
Total weight landed in the season ...	12,322,990 kg.
Mean value of 100 kg.....	31.52 fr.
Total value of the season	3,856,044 fr.
Number of individuals destroyed.....	123,553,199

Number of herrings examined in 5 years: 5,629

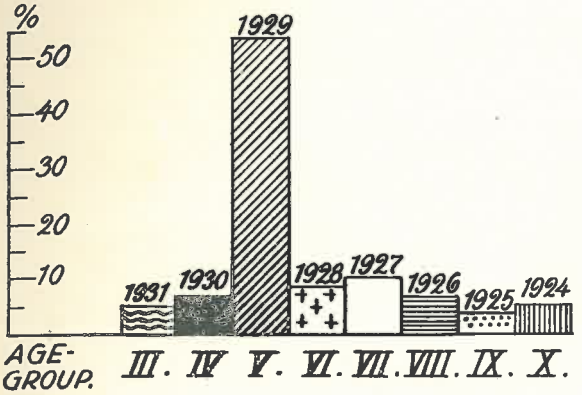

Fig. 2. Showing what would have been the height of each column if the new class 1931 had been only 5 %.

VII) Occurrence of the shoal of spents.

In 1934—35, as was the case in 1933—34, the shoal has kept all the time far to the west, off Calais and Gris-Nez, and has even penetrated further down into the Channel; it is likely that their spawning grounds were in the same westerly region. The consequences of this were:

a) that the smaller kind of boats of the Belgian seaports were prevented from partaking in the fishing for spents, on account of the long distance entailing an expense in fuel;

b) that the young herrings born on these westerly spawning grounds attained the scaly stage during their north-easterly migration before reaching the Belgian part of the coast. The result was that the young breed of herring when reaching the vicinity of Ostend was already in the scaly, silvery, condition, and that very little whitebait was observed at the entrance of Ostend harbour.

VIII) Previsions.

A. At the end of the season 1934 our forecast for the season 1934—35 was worded like this: "All considered, the prognostic for 1934—35 is in favour of the appearance of an important concentration of spent herrings." It is worth noticeing that this forecast, based on the high proportion, in 1934, of two classes which previously had a high percentage in two good years: 1931 and 1934, was entirely successful.

B. Our forecast for 1935—36, based mostly on the study of the age composition in the biological scale, is as follows: "good season for spent herrings with a majority of individuals aged 4 and 6 years." —

Principal considerations leading to that forecast:

a) The year-class 1929, with a very high percentage in the good season 1933—34, is still remarkably represented, aged 5 years, in 1934—35, which is the densest concentration recorded, and it is likely to come back in notable proportion in 1936.

b) Among the older classes, three have played an important part in the good season 1930—31 and, more recently, in 1933—34 and 1934—35, and the remnants of these generations are not yet exhausted.

c) The year-class 1931 is arising in the rich year 1934—35 with a high initial percentage foreboding a still higher proportion in the next year.

This forecast obtains a certain probability from the fact that it is simply a rational deduction from the methodical analysis of 5 successive shoals. Many, however, are the unforeseen events that may make the most cautious forecast either a satisfactory success or a complete failure. A thorough comprehension of the vital cycle of our southern herring might impart a greater security to the oracles of the biologist, but this cycle will never be made out, nor its mechanism thoroughly understood without intervention of the hydrographer and the meteorologist, and even when it will appear sufficiently known and understood, their constant collaboration will still be needed to find out the unforeseen in good time for prediction before each of the fishing seasons.

All this and many other considerations of pure as well as of applied science show well how consistent is the scheme of an international survey of the Intermediate Channel-North Sea Region and the necessity of the setting up of a continuous Patrol Service in this most interesting area. Meanwhile we must acknowledge the meritorious efforts made in advance by the British hydrobiologists Borley, Carruthers, Davis, Doodson, Hardy, Lumby, Thursby-Pelham, Russell, Savage, Wallace, Wimpenny and others, as well as of those who are studying the movement of water in the near Atlantic, Channel, Central and Northern North Sea and Skagerak. — Carruthers' recent paper on "The Flow of Water through the Straits of Dover" is of special interest with regard to the comtemplated survey of the area.